Learning and Teaching Centre

MACQUARIE UNIVERSITY

Report on Undergraduate Awareness, Experiences and Perceptions of Research at Macquarie University

by

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1 Executive Summary

This report summarises the key findings of a study about undergraduate awareness, experience and perception of research undertaken at Macquarie University in 2011. The study involved a random sample of 200 undergraduate students completing a face-to-face survey which was designed to gather both quantitative and qualitative data. The research found the following:

1. Undergraduate students at Macquarie were generally aware of research and had experienced research in a range of ways. For example, many students knew about research posters, units and conferences and postgraduate opportunities, and could identify a variety of specific staff research activities. Many had heard lecturers and guest lecturers discuss their research work, undertaken independent projects and read research produced by staff.
2. Staff involvement in research was considered by undergraduates to carry many benefits. These included increased enthusiasm and interest among staff and students, a better understanding of subject matter and awareness of problems and issues facing the subject(s) and increased motivation to pursue postgraduate studies. A number of students also felt that it benefitted their professional skills and employability.
3. Undergraduates valued actively engaging in research. Approximately half believed that they learnt best when undertaking their own research, and approximately three-quarters felt that they learnt best when lecturers involved them in the research process.
4. However, undergraduate awareness and experience of research was limited in some respects. Many were not aware of any staff research, staff research interests or university strengths, and the experience of research was for most a largely passive affair. For example, undergraduate students very rarely acted as research assistants, contributed to research output or attended conferences.
5. It is important to note that approximately half of those interviewed reported that they did not develop any research skills.
6. Staff research activity also had some negative impacts. Principally, these included staff not having enough time to see undergraduates, manifesting a lack of interest in supporting students' learning, and dominating the content of courses with their research interests.
7. The findings of the present study were generally consistent with the data in the literature, although undergraduates at Macquarie had slightly more awareness and experience of research and identified staff research activity as beneficial slightly more frequently.

In light of these findings, this report recommends that further steps be taken to develop undergraduates' awareness of research, to actively involve them in research in their courses and to effectively integrate research with teaching. Undergraduate students should also be provided with more opportunities to develop their research skills, and measures should be taken to eliminate the negative impacts of research described above. In short, undergraduate students should be more often and more closely involved in the research process.

2 Background

The relationship between research and teaching has been subjected to extensive scrutiny. A number of studies have attributed benefits to students becoming active participants in "communities of inquiry" (Brew, 2003; Healey, 2005; Le Heron, Baker & McEwen, 2006; Robertson & Bond, 2005). For example, Healey, Jordan, Pell and Short (2010: 243) have argued that inquiry- or research-based learning is an effective way to integrate teaching with research. Students benefit from staff research, a critical and interdisciplinary approach is developed and skills valued by employers are honed. Evidence to support the view that the experience of research provides benefits to undergraduate students is especially important in a world where students as fee-payers and universities as service providers approach university education instrumentally (Foskett, Roberts & Maringe, 2006).

Most of the earliest studies on the links between research and teaching from the point of view of students themselves are small-scale and qualitative in nature (Blackmore & Cousin, 2003; Jenkins, Blackman, Lindsay & Paton-Saltzberg, 1998; Lindsay, Breen & Jenkins, 2002; Neumann, 1994; Robertson & Blackler, 2006; Zamorski, 2002). In the last few years, the use of questionnaires to amass quantitative as well as qualitative data has become more prominent (Breen & Lindsay, 1999; Healey et al., 2010; Short, Healey & Romer, 2010; Spronken-Smith, 2011; Turner, Wuetherick & Healey, 2008). Generally, the research has found that students experienced a range of benefits from engaging with their own research as well as staff research, although certain problem areas have been identified, especially where it was felt that staff research took precedence over students' learning.

It is the aim of the present study to contribute to the growing body of research on students' awareness, experiences and perceptions of research by examining and analysing both quantitatively and qualitatively the views of undergraduate students at Macquarie University.

3 Methodology

A number of methodological choices were made in order to contextualise the research, eliminate bias, ensure a representative sample and gather useful data. Gaining an understanding of students' actual views and experiences at Macquarie was central. This purpose guided every aspect of the research process.

3.1 The Survey

The survey used was *The Student Experience of Teaching, Research and Consultancy*, developed in 2002 at the University of Gloucestershire, UK by Healey, Jordan, Pell and Short (Healey et al., 2010) and subsequently utilised by other researchers (Short et al., 2010; Spronken-Smith, 2011; Turner et al., 2008), including for a parallel study to the present one conducted at the University of Queensland. The survey was modified in consultation with the University of Queensland researchers to better fit the Macquarie context.

The questionnaire was primarily oriented towards the gathering of quantitative data. The first two questions related to awareness and experience of research and required a yes/no answer. This was followed by questions which asked students to report what percentage of staff they were aware engaged in research within their subject area(s) and to compare this to areas of study outside of their own. If they were not aware of any staff research in their own subject area(s), the interview proceeded to demographic questions before concluding. If they *were* aware, a number of questions followed in which the student was allowed to check as many boxes as necessary in relation to specific staff research activities and the positive and negative effects of staff research on their own learning. Following this, students were asked to place various statements relating to research, teaching and learning on a five-level Likert scale (the options being strongly disagree, disagree, neutral, agree and strongly agree).

Students were also given an opportunity to provide detailed responses. The questions relating to the positive and negative impacts of staff research on their learning allowed them to discuss one significant example of each. At the end of the survey, they could also comment in any way they wished on anything they thought would be of interest to the study. These opportunities meant that substantial qualitative data was also gathered to supplement and reinforce the quantitative results. An examination of this qualitative material occupies an important place in this report.

3.2 The Collection of Data

The data was collected via face-to-face interviews with undergraduate students. These were administered by an undergraduate scholar, using a Macquarie laptop and the online program

SurveyMonkey. The interviewees read the survey questions (or, where appropriate, had the questions read to them). Their responses were entered manually on the laptop by the undergraduate scholar, except in some cases where the interviewee desired to type in detailed responses themselves. These responses were modified only for spelling mistakes and grammatical errors. Where transcription for qualitative responses was carried out, statements were recorded verbatim to preserve authenticity.

There was a definite rationale for administering face-to-face interviews and having the undergraduate scholar enter the responses into the laptop, rather than using a web-based survey. It was felt that this approach would increase the quality of the responses – the thoughtfulness, care and detail embodied in each entry – as students would be encouraged to think seriously about each question. In particular, it was felt that students – especially those who lacked confidence in their English language skills – would be more likely to take the opportunity to provide detailed answers. As substantially more qualitative data has been gathered compared to similar studies, this was a successful approach.

However, it did have a limitation. It was anticipated that some students might be reluctant to offer negative assessments of various aspects of their research experience. A partial solution to this problem was found by posing questions in a different way, or by asking further questions for clarification and to secure consistency with previous answers.

The timing of the study was also methodologically important. The decision to conduct the research at the end of the academic year was a necessary if useful first-year student responses were to be gathered, as it was self-evident that newly enrolled first-years would lack significant awareness of research or substantial experiences to reflect upon. However, it is acknowledged that this position is not without its drawbacks. The literature has identified the existence and importance of having first-year undergraduates introduced to research very early in their degrees (Jenkins & Healey, 2009). It is not possible on the basis of the present study to determine when precisely first-years encountered research at Macquarie or how this impacted upon them; they can only be assessed from the vantage point of late 2011, the cusp of their completion of their first year of university. A future study based on in-depth interviews will address this problem by asking students to reflect upon their earliest experiences of research.

4 The Sample

200 students were selected on a random basis. Undergraduates were approached to complete the survey in public spaces such as the library, the main courtyard, the various cafes on campus and the campus hub. However, on occasion it was felt that an insufficient number of students from certain faculties – particularly Business and Economics – were frequenting these locations. It became a concern that certain disciplines would be underrepresented in the data. To remedy this problem, some time was spent interviewing students in the main faculty buildings, and this time was distributed evenly between faculties.

Apart from ensuring the quality of responses, an online survey was also decided against because of self-selection bias, a major problem in social science research (Ziliak & McCloskey, 2008). An online survey could compromise the representativeness of the present study's data in various ways, leading to inaccurate conclusions about undergraduate research as a whole. For example, those already heavily involved or interested in research might be more likely to take the questionnaire. In particular, final-year or honours students would be overrepresented. In addition, students with heavier workloads or less free time for whatever reason may be less likely to respond.

The importance of a random sample to the investigation was starkly obvious when the spread of undergraduate students between different faculties was considered. Many respondents in the survey identified with two or three faculties, as many of them were undertaking a combined degree or had

substantial interdisciplinary experience. By contrast, Macquarie places all students in a single faculty for administration purposes. By using a random sample and allowing students to nominate which faculty they were affiliated with, the totality of students' actual views, experiences and perceptions was accounted for, in line with the overarching aim of the study. This probably explains the higher number of science and human sciences respondents and the very high number of arts respondents in the survey, compared to the University records (see Table 1 and discussion below). It is notable that the same issue arose at the University of Queensland, and that the researchers there decided similarly.

4.1 Demographics

Demographic data for Macquarie is based on the *Macquarie University 2010 Profile* and the *Macquarie University 2010 Annual Report*, both available from the Macquarie website. At the time of writing, no University records for 2011 were available.

The sample was broadly representative in terms of faculty. As previously mentioned, the fact that students were permitted to indicate affiliation with more than one faculty where appropriate is the most likely cause for the greater presence of Arts, Science and Human Sciences students compared to the University records:

Table 1. Undergraduate students in each faculty (%)

Source of Data	Faculty			
	Arts	Business and Economics	Science	Human Sciences
Macquarie University Records	21.8	50.3	12.3	15.6
Survey Sample (200 students)	40	40.5	21	21

The Business and Economics majority was also slightly smaller than in the University records. A possible explanation for this is the much higher proportion of international students in this faculty compared to the other faculties. International students often declined to participate in the survey, perhaps due to lack of confidence in English. Indeed, although a third of Macquarie students are international students, only a quarter of respondents had lived in Australia for five years or less.

The sample was also representative according to other measures. The proportion of male and females was roughly equal, with marginally more females than males. Most respondents who were not born in Australia were born in East Asian or Southeast Asian countries such as China, Hong Kong, Vietnam and Malaysia. Finally, the spread of respondents between the first, second and third years of study was roughly equal – about 30% (60) – with very small minorities identifying as fourth and fifth years or honours students.

The only unrepresentative aspect of the data relates to study load and age. Respondents were almost all full-time students and 25 years of age or under, even though a third of Macquarie students are part-time. Thus, one limitation of live interviews is that part-time students, who are also more likely to be mature age students, will be underrepresented, as they spend less time on campus.

4.2 Results and Discussion

The percentages reported below for each question represent the proportion of those who selected at least one of the possible options for that question. This is important to note because not all respondents were asked all questions (see the discussion of the survey above), and not all questions required an answer. Where necessary in the text, the number of students who selected each option has been provided in parentheses for clarity. However, it should also be noted that with the exception of the question on negative impacts on staff involvement in research, very few students opted to skip questions.

4.2.1 Students' Awareness and Experiences of Research

The data revealed that a majority of undergraduate students were generally aware of research occurring at Macquarie. For example, a sizeable number were aware of research seminars, conferences, units and posters, exhibitions or displays; even more students knew about notice boards advertising postgraduate opportunities or research produced by staff; and many were aware of *specific* staff research activities:

Table 2. Percentage and number of students responding "yes" to the question "Are you aware of any of the following occurring in the University?"

Statement	Response (%)	Response (No.)
Books, journal articles and other forms of research output (eg images, performances, artefacts, devices and designs) produced by university staff	83.5	167
Notice boards advertising research and postgraduate opportunities	81.5	163
Research posters/exhibitions/displays within the University	68	136
Research seminars/conferences	65	130
Existence of research units	62	124
Research reports produced by the University	53	106
Areas within the University with national/international research reputations	48	96

Note: Total no. of responses to this question = 200.

Table 3. Percentage and number of students indicating the following research activities for the question "Which of the following types of research activities are you aware that the staff who teach you are engaged in?"

Research Activity	Response (%)	Response (No.)
Undertaking research	77.4	127
Undertaking a research degree (eg Masters/PhD/EdD)	73.8	121
Writing for publication	64	105
Supervising research students and assistants	62.2	102
Producing artistic works embodying original research	16.5	27

Note: Total no. of responses to this question = 164.

A comparison across four institutions in Canada, the UK and New Zealand yields similar results, with students being somewhat less aware of all of the above, including specific staff research activities, than at Macquarie (Healey et al., 2010: 239; Short et al., 2010: 4-5; Spronken-Smith, 2011: 3; Turner et al., 2008: 202-3).

When the focus is shifted to student experiences, it is evident that a significant majority of students had had certain experiences (see Table 4 below). These included hearing teachers and guest lecturers discuss their research work in a lecture, undertaking an independent project involving research as part or whole of a unit and reading a research paper or report written by a member of staff. These findings are again generally consistent with those at other institutions (Healey et al., 2010: 239-40; Short et al., 2010: 5; Spronken-Smith, 2011: 4; Turner et al., 2008: 203-4), although at Macquarie, substantially higher numbers claimed they had undertaken an independent project. Given that few interviewees had taken part in an honours program, the fact that 12% (24) claimed they had undertaken a "dissertation" or "thesis" suggests that there was some misunderstanding on the part of the respondents as to the meaning of these words.

Table 4. Percentage and number of students responding "yes" to the question "During your studies at the University have you gained experience of any of the following?"

Statement	Response (%)	Response (No.)
Hearing a guest lecturer discuss their research work in a unit	74	148
Undertaking an independent project involving research (eg an essay, oral presentation, poster or creative work) as a part or whole of a unit	72.5	145
Hearing a member of staff discuss their research work in a unit	69.5	139
Reading a research paper or report written by a member of staff	60	120
Critically examining art/artefacts, such as an image, performance, device or design, produced by a member of staff	23.5	47
Undertaking a dissertation or thesis	12	24

Note: Total no. of responses to this question = 200.

4.2.2 The Positive Impacts of Staff Involvement in Research

There was substantial quantitative evidence to suggest that many undergraduates saw staff involvement in research as beneficial to their own learning (see Table 5 below). The most common benefits identified by respondents were increased understanding of the subject, increased awareness of problems and issues facing the subject area(s) and increased enthusiasm and interest. However, increased motivation to pursue postgraduate studies in the same area was also reported.

Table 5. Percentage and number of students indicating the following positive impacts for the question "Thinking about the staff who teach you, in your experience has their involvement in research had a positive impact on your learning in any of the following ways?"

Statement	Response (%)	Response (No.)
Increased my understanding of the subject	78.1	121
Increased my awareness of the problems and issues faced in my subject area(s)	65.8	102
Stimulated my interest and enthusiasm for the subject	57.4	89
Contributed to the development of my research skills	47.1	73
Motivated me to consider pursuing postgraduate research in the same area	43.2	67

Note: Total no. of responses to this question = 155.

A sample of detailed responses reinforces the data in Table 5, clearly illustrating the advantages that students received from having their teachers involved in research:

> One of the lecturers from economics talked about their research. He shared information and it helped me learn about economics better than if he had just taught from the textbook.

> ... [name of lecturer] is engaged in both teaching and research. I read some of his papers... These examples encouraged me to consider work as a researcher in finance or become an academic.

Students also identified benefits beyond those that they were prompted to consider, such as increased staff enthusiasm and its effect on the classroom and, crucially, the development of the student's employment or professional skills:

> When the lecturer is enthusiastic the students feel the same way.

> ... his enthusiasm definitely shows whenever he talks about his research.
>
> Our lecturer has personal experience in the field and runs his own business, and this helped give me a perspective on what it's like to actually run your own business.

Similar quantitative and qualitative evidence has been reported in the literature, although undergraduates at Macquarie perceived staff involvement in research to be beneficial slightly more frequently than students at other institutions (Healey et al., 2010: 240-1; Short et al., 2010: 6; Turner et al., 2008: 204-6). Such findings are of immense importance given the pressure placed on modern universities to both be research-intensive and provide a high-standard of education. In particular, it is noteworthy that the primary goal of research programs in Australian universities is to attract students to postgraduate study (Brew & Jewell, 2012), and that students place great value on skills that are useful in industry (Healey et al., 2010: 241) and employment more generally (Foskett et al., 2006). Therefore, there is a strong argument to be made for increasing the role that staff research plays in undergraduate education at Macquarie.

4.2.3 Undergraduate Students' Assessment of the Value of Research

The data demonstrates that undergraduates themselves viewed active involvement in research as highly beneficial:

Table 6. From your experience to what extent do you agree with the following statements?

Statement	Strongly Disagree/ Disagree (%)	Neutral (%)	Agree/Strongly Agree (%)
I have learnt most when undertaking my own research/dissertation	12.6 (21)	37.1 (62)	**50.3 (84)**
Insufficient attention is given in the subject(s) I study to developing our research skills	48.8 (82)	28 (47)	23.2 (39)
The most effective teaching is when the lecturer involves us in aspects of the research process	6.6 (11)	19 (32)	**74.4 (125)**

Note: Values in parentheses indicate no. of students. Total no. of responses to this question = 168. Bold values signify key data.

Comparable data leading to similar conclusions is presented in the other studies (Healey et al., 2010: 239; Turner et al., 2008: 205). Such results are consistent with constructivist theories of education, which emphasise the role of the learner in their own education (Bonwell & Eison, 1991) and the creation of meaning, and hold that knowledge is not simply transferred, but interpreted through the lens of previous knowledge and experience. Therefore, it is imperative that the active involvement of undergraduates in research become more widespread and frequent.

4.2.4 The Limits of Students' Awareness and Experiences

There are however striking limitations to be overcome at Macquarie in terms of undergraduate awareness and experience of research.

First, with reference to awareness, a significant number were aware of no staff research or very little staff research taking place or did not have any idea about how their subject area(s) compared to other subject areas in terms of the proportion of staff involved in research:

Table 7. Percentage and number of students indicating the following proportions for the question "Of the academic staff in your subject area(s), approximately what proportion are you aware are engaged in research?"

Proportion	Response (%)	Response (No.)
None	17	34
1-20%	25.5	51
21-40%	16.5	33
41-60%	17.5	35
61-80%	10.5	21
81-100%	13	26

Note: Total no. of responses to this question = 200.

Table 8. Percentage and number of students indicating the following proportions for the question "Do you feel that this proportion is different from that in the University as a whole?"

Proportion	Response (%)	Response (No.)
Less than	19.5	39
Similar	32	64
More than	16.5	33
Don't know	**32**	**64**

Note: Total no. of responses to this question = 200. Bold values signify key data.

The latter in particular is noteworthy because it suggests a disconnection between what professional researchers practise and what undergraduates experience in terms of teaching and research.

Many students were also unaware of staff research interests or university strengths. 20.8% (35) respondents agreed with the statement "I have little awareness of my lecturers' research interests" and 27.4% (46) were neutral towards it. Thus, almost half of the interviewees were not truly aware of their lecturers' research interests, as a neutral response to a question of personal awareness strongly suggests a lack of knowledge. Furthermore, only 48% (96) of the students submitted that they were aware of areas within Macquarie with national or international research reputations (see Table 2 above). In this last respect, Macquarie stands between various other institutions, some of whose samples reported slightly higher awareness than at Macquarie and some of whose reported significantly lower (Short et al., 2010: 4; Spronken-Smith, 2011: 3; Turner et al., 2008: 203).

Second, as is evident from Table 9, the surveyed students' experiences of research were largely passive rather than active and were not integrated with or related to staff research activity.

The sole active research experience that most students have engaged in is undertaking an independent project (see table 4 above). However, in light of this, it is very concerning that *almost half of the respondents felt that they had not developed any research techniques at Macquarie* (see table 9 below). It is also concerning that it appears that a similar proportion did not perceive staff involvement in research as contributing to the development of their own research skills (see table 5 above).

Table 9. Percentage and number of students responding "yes" to the question "During your studies at the University have you gained experience of any of the following?"

Statement	Response (%)	Response (No.)
Development of research techniques (e.g. interviewing, laboratory analysis, performance skills, design skills, statistical analyses, textual analysis, archival search skills, fieldwork skills)	48	96
Being involved in practical activities/fieldwork based on research projects	41	82
Being a subject/participant in a research project run by a member of staff (e.g. in a study of learning experiences, an examination of exercise in sports, or a psychology experiment)	32	64
Attending a University research seminar (not as part of a unit)	15.5	31
Attending an artistic performance or exhibition linked to your subject area(s)	15.5	31
Contributing to a research paper or other form of research output	17	34
Attending a research conference	11	22
Acting as a research assistant	9.5	19
Contributing to a research conference paper or poster	8	16

Note: Total no. of responses to this question = 200.

The data thus indicates that undergraduates experience research passively, but are generally not involved in professional research, are not full members of the research community and do not intersect with staff research routinely as a part of their education. This analysis is supported by the literature, which shows that at other institutions, students often had even less of these active experiences than at Macquarie (Healey et al., 2010: 240; Short et al., 2010: 5; Turner et al., 2008: 203-4). Addressing this is all the more important given the proven benefits of staff research activity and active student engagement in research. Indeed, for those who did see staff involvement in research as beneficial to their own research skills, *actively* participating in research was decisive:

> ... In another example, we were given an assignment to find a solution to a problem that had arisen as part of the lecturer's research. This taught me skills about research for the future, the steps I should take when researching etc.

4.2.5 The Negative Impacts of Staff Involvement in Research

As with previous studies (Healey et al., 2010: 242; Short et al., 2010: 6; Turner et al., 2008: 205-6), a number of negative impacts stemming from staff involvement in research were identified:

Table 10. Percentage and number of students indicating the following negative impacts for the question "Thinking about the staff who teach you, in your experience has their involvement in research had a negative impact on your learning in any of the following ways?"

Statement	Response (%)	Response (No.)
Their research interests dominating the content of what they teach	55.4	31
Lack of availability of these staff to see me	33.9	19
Apparent lack of interest by these staff in supporting my learning	23.2	13

Note: Total no. of responses to this question = 56.

A sample of the qualitative data demonstrates a number of students voicing dissatisfaction:

> They are too busy/not interested in undergrads, by and large.
>
> Most of the time they are very busy with their research and if you can't make it to the tute you can't see them.
>
> It was very difficult to comprehend what they were saying. It wasn't just me feeling like this, the majority of the students felt it. There was a lot of terminology that people did not understand. They could not explain the subject matter well.
>
> A particular lecturer spent excessive amounts of time teaching his own favourite topic rather than focusing on other areas of the course which were proportionally of equal weight in the course... the worst was when he set an assignment on this topic and did not give us an option to do anything on the other 50% of the course.

Although it must be remembered that such views were held by a minority of students, with only 28% (56) of respondents identifying any negative impacts and most choosing to skip this question, it is important that complacency is avoided and that concerns are addressed. The negative impacts highlighted by the data are real impediments to undergraduate education and detract from the potential benefits of staff involvement in research.

4.3 Conclusion

This study has gathered, reported and systematically compared data on undergraduate awareness, experience and perception of research at Macquarie University.

Research at Macquarie has both strengths and weaknesses and advantages and disadvantages from the perspective of undergraduate education. Students are generally aware of research and feel that they derive many benefits from staff involvement in research; at the same time, they lack awareness in some areas, are usually not actively involved in research, often do not develop research skills and perceive some negative effects of staff research activity. However, these issues – which require attention – should not obscure the fundamentally positive role that research has to play. To the extent that there are problems to be addressed, they largely relate to the fact that students are *not* more integrated, *not* more aware and *not* actively experiencing research. The evidence overwhelmingly supports the literature's contention that research should become more integrated with teaching.

Therefore, the present study seconds the call by Jenkins and Healey (2009) that undergraduate engagement in research should become the norm in university education. Specifically, it makes the following recommendations:

1. Further steps should be taken to increase undergraduate awareness of research;
2. Further steps should be taken to actively involve undergraduates in research in their courses;
3. Further steps should be taken to integrate teaching with research more effectively;
4. More opportunities to develop research skills must be provided to undergraduates;
5. The negative impacts of research discussed in this report should be eliminated.

In summary, *undergraduate students at Macquarie must become more frequently and more closely involved in the research process*.

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